

DEPOSITION OF TUNGSTEN NITRIDE

ABSTRACT OF THE DISCLOSURE

Methods for depositing a tungsten nitride layer are described. The methods form a
5 tungsten nitride layer using a carefully controlled deposition technique such as pulsed
nucleation layer (PNL). Initially, a tungsten layer is formed on a substrate surface. The
tungsten layer is then exposed to a nitriding agent to form a tungsten nitride layer.
Methods of forming relatively thick layers of involve repeated cycles of contact with
reducing agent, tungsten precursor and nitriding agent. In some cases, the cycle may also
10 include contact with a dopant precursor such as phosphine or arsine.